TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project: LOUDOUN COUNTY LANDFILL, SB-4

Location:

Total area draining to basin: 76.20 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. Yds. x Total Drainage Area (acres.)

67 cu. yds. x 76.20 acres = 5106 cu. yds.

- 2. Available basin volume = 6820 cu. yds. at elevation 326.25 (From storage — elevation curve.)
- 3. Excavate 0 cu. yds. to obtain required volume*.
- * See Plan (Siltation And Erosion Control Phase I)
- 4. Available volume before cleanout required.

 $34 \text{ cu. yds. x} \quad 72.60 \quad \text{acres} = 2591 \quad \text{cu. yd}$

5. Elevation corresponding to cleanout level = 324.50

(From Storage - Elevation Curve.)

6. Distance from invert of the dewatering orifice to cleanout level = 1.75 ft. (Min. = 1.0 ft.)

Dry Storage:

- 7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres) 67 cu. yds. \dot{x} 76.20 acres = 5,106 cu. yds.
- 8. Total available basin volume at crest of riser* = 17,099 cu. yds. at elevation 329.80 (From Storage — Elevation Curve.)
 - * Minimum = 134 cu. yds./acre of total drainage area.
- 9. Diameter of dewatering orifice = 19 in.
- 10. Diameter of flexible tubing = 21 in. (Diameter of dewatering orifice plus 2 inches.)

Preliminary Design Elevations

11. Crest of Riser = 329.80

Top of Dam = 332.20

Design High Water = 330.80

Upstream Toe of Dam = 320.00

Basin Shape

12. Length of Flow L = 425'Effective Width

If > 2, baffles are not required X

If < 2, baffles are required

Runoff

- 13. Q2 = 65.15 cfs (From Chapter 5.) (C=.30, I=2.85 IN/HR, Tc=29 MIN.)
- 14. Q25 = 101.27 cfs (From Chapter 5.) (C=.30, I=4.43 IN/HR, Tc=28 MIN.)

Principal Spillway Design

- 15. With emergency spillway, required spillway capacity Qp = Q2 = 65.15 cfs. (Riser and barrel.)
 - Without emergency spillway, required spillway capacity Qp = Q25 = 101.27 cfs.
- (Riser and barrel.) 16. With emergency spillway:

Assumed available head (h) = 1.0 ft. (Using Q2)

- h = Crest of Emergency Spillway Elevation Crest of Riser Elevation
- Without emergency spillway:

Assumed available head (h) = 2.0 ft. (Using Q25)

h = Design High Water Elevation — Crest of Riser Elevation

MINIMUM OF 1' OF FREEBOARD MUST BE MAINTAINED BETWEEN CREST OF RISER AND CREST OF EMERGENCY SPILLWAY.

17. Riser diameter (Dr) = 96 in. Actual head (h) = 1.0 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (I) = 72 ft.

Head (H) on barrel through embankment = 4.70 ft. (From Plate 3.14-7.)

19. Barrel diameter = 36 in. (RCP)

(From Plate 3.14—B [concrete pipe] or Plate 3.14—A [corrugated pipe.])

20. Trash rack

Diameter = 126 inches.

Height = 30 inches.

Emergency Spillway Design

21. Required spillway capacity Qe = Q25 - Qp = 36.12 cfs.

22. Bottom width (b) = 120 ft.; the slope of the exit channel (s) = 0.03ft./foot; and the minimum length of the exit channel (x) = 52 ft.

(From Table 3.14-C.)

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 9.8

Slope of upstream face of embankment (Z) = 3:1

Slope of principal spillway barrel (Sb) = 0.5%

Length of barrel in saturated zone (Ls) = 72 ft

24. Number of collars required = 2 dimensions = 6.2' x 6.2'

(From Plate 3.14-12.)

Final Design Elevations

25. Top of Dam = 332.20

Design High Water = 330.80

Emergency Spillway Crest = 330.80

Principal Spillway Crest = 329.80

Dewatering Orifice Invert = 326.25

Cleanout Elevation = 324.50

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 320.00 Type.... Vol: Elev-Area

Name.... POND SB-4

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	Elevation (ft)	Planimeter (sq.in)	Area Ald (sq.ft)	A2+sqr(A1*A2) (sq.ft)	Volume (cu.yd.)	Volume Sum (cu.yd.)
_	320.00		0	0	.00	.00
	322.00		10589	10589	261.46	261.46
	324.00	AM FOR COM TO	40904	72305	1785.31	2046.76
	326.00		71421	166375	4108.03	6154.79
	328.00		78141	224268	5537.47	11692.25
	330.00		84767	244295	6031.97	17724.22
•	332.00		91547	264406	6528.54	24252.76

Elevations With Areas Interpolated From The Closest Two Planimeter Readings

Elevation		Planimeter	Area A1+A2+sqr(A1*A2)		Volume	Volume Sur
(ft)	(ft)	(sq.in)	(sq.ft)	(sq.ft)	(cu.yd.)	(cu.yd.)
	324.50		47741	132836	819.97	2866.73
	326.25		72244	215497	665.11	6819.90
	329.80		84092	243295	5406.52	17098.78

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt. (Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment Area1, Area2 = Areas computed for EL1, EL2, respectively = Incremental volume between EL1 and EL2

Interpolated area from closest two given contour areas is computed using the relationship:

IA = (sq.rt(Areal) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))**2

where: E1, E2 = Closest two elevations with planimeter data = Elevation at which to interpolate area

Areal, Area2 = Areas computed for E1, E2, respectively = Interpolated area for Ei

S/N: 35YXYWHCNJ50 Bentley PondPack (10.00.023.00)

2:21 PM

Solid Waste Services 12/27/2007



UNIT 0 ADIN RY ODS RIMA

(SB-

PLAN STATUS DATE DESCRIPTION GA GA DESIGN DRAWN CHKD SCALE H: N/A

DATE 01/22/08 35 of 40

SHEET